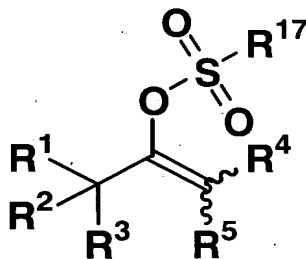


CLAIMS

1. A process for producing a vinyl perfluoroalkanesulfonate derivative represented by general formula (IV):



(IV)

(wherein R¹, R², R³, R⁴ and R⁵ may be the same or different and each represents a hydrogen atom, substituted or unsubstituted lower alkyl, substituted or unsubstituted lower alkoxy, substituted or unsubstituted lower alkoxy carbonyl, substituted or unsubstituted lower alkanoyl, substituted or unsubstituted lower alkanoyloxy, substituted or unsubstituted lower alkenyl, substituted or unsubstituted lower alkynyl, substituted or unsubstituted lower alkadienyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted cycloalkenyl, substituted or unsubstituted cycloalkynyl, substituted or unsubstituted cycloalkadienyl, substituted or unsubstituted aralkyl, substituted or unsubstituted aralkyloxy, substituted or unsubstituted aralkyloxycarbonyl, substituted or unsubstituted aryl,

substituted or unsubstituted aryloxy, substituted or unsubstituted aryloxycarbonyl, a substituted or unsubstituted heterocyclic group, nitro, nitroso, halogen, carboxy, $-S(O)_nR^6$ (wherein n represents 0 or 1, and R^6 represents substituted or unsubstituted lower alkyl, substituted or unsubstituted aralkyl, or substituted or unsubstituted aryl group), $-P(O)_mR^{6a}R^{6b}$ (wherein m represents 0 or 1, and R^{6a} and R^{6b} may be the same or different and each has the same meaning as R^6 defined above), or $-NR^7R^8$ [wherein R^7 and R^8 may be the same or different and each represents a hydrogen atom, substituted or unsubstituted lower alkyl, substituted or unsubstituted aralkyl, substituted or unsubstituted aryl, substituted or unsubstituted lower alkoxy, substituted or unsubstituted lower alkanoyl, substituted or unsubstituted lower alkanoyloxy, $-CONR^{6c}R^{6d}$ (wherein R^{6c} and R^{6d} may be the same or different and each has the same meaning as R^6 defined above), or $-SO_2R^{6e}$ (wherein R^{6e} has the same meaning as R^6 defined above)]; R^1 and R^2 are combined together with the adjacent carbon atom thereto to form R^9 (wherein R^9 represents substituted or unsubstituted cycloalkyl, substituted or unsubstituted cycloalkenyl, substituted or unsubstituted cycloalkynyl, substituted or unsubstituted cycloalkadienyl, or a substituted or unsubstituted heterocyclic group); R^4 and R^5 are combined together with the adjacent carbon atom

thereto to form R^{10} (wherein R^{10} has the same meaning as R^9 defined above);

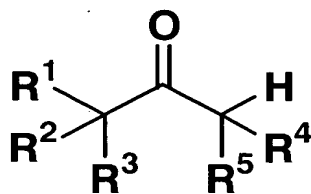
R^1 , R^2 and R^3 are combined together with the adjacent carbon atom thereto to form R^{11} (wherein R^{11} represents substituted or unsubstituted aryl, or a substituted or unsubstituted heterocyclic group);

R^1 and R^4 are combined together with the two carbon atoms which are adjacent to R^1 or R^4 , respectively, and the carbon atom between these two carbon atoms to form a substituted or unsubstituted carbocycle, or a substituted or unsubstituted aliphatic heterocycle; or

R^1 , R^2 , R^3 , R^4 and R^5 are combined together with the two carbon atoms which are adjacent to R^1 , R^2 , R^3 , R^4 or R^5 , respectively, and the carbon atom between these two carbon atoms to form a substituted or unsubstituted carbocycle, a substituted or unsubstituted aliphatic heterocycle, or a substituted or unsubstituted condensed ring, and

R^{17} represents a fluorine atom or perfluoroalkyl)

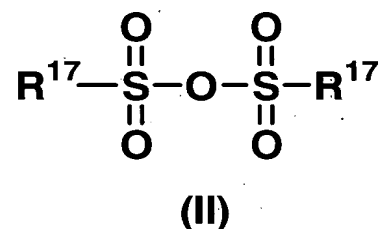
which comprises reacting a carbonyl compound represented by general formula (I):



(I)

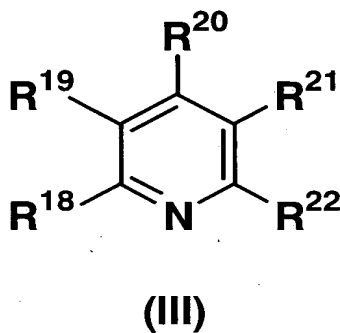
(wherein R¹, R², R³, R⁴ and R⁵ have the same meanings as defined above, respectively)

with a perfluoroalkanesulfonic anhydride represented by general formula (II):



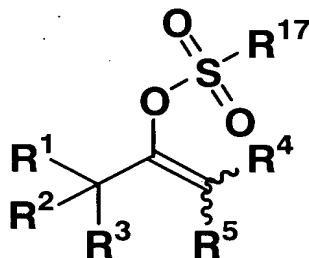
(wherein R¹⁷ has the same meaning as defined above)

in the presence of a pyridine derivative represented by general formula (III) in an amount of 0.1 to 1.0 equivalent to the perfluoroalkanesulfonic anhydride:



(wherein R¹⁸, R¹⁹, R²⁰, R²¹ and R²² may be the same or different and each represents a hydrogen atom, halogen, substituted or unsubstituted lower alkyl, or substituted or unsubstituted lower alkoxy; with the proviso that when R¹⁸ and R²² are *tert*-butyl, and R¹⁹ and R²¹ are hydrogen atoms, R²⁰ is not methyl).

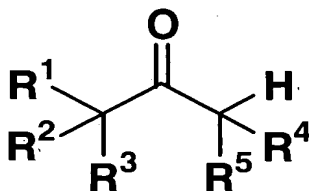
2. A process for producing a vinyl perfluoroalkanesulfonate derivative represented by general formula (IV):



(IV)

(wherein R¹, R², R³, R⁴, R⁵ and R¹⁷ have the same meanings as defined above, respectively)

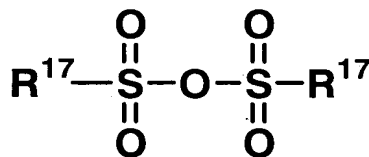
which comprises adding a carbonyl compound represented by general formula (I):



(I)

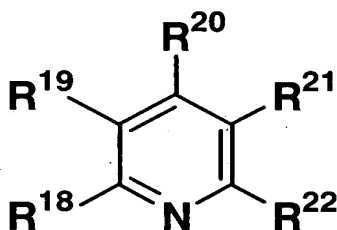
(wherein R¹, R², R³, R⁴ and R⁵ have the same meanings as defined above, respectively)

to a suspension or a solution containing a perfluoroalkanesulfonic anhydride represented by general formula (II):



(II)

(wherein R^{17} has the same meaning as defined above)
and a pyridine derivative represented by general formula
(III) in an amount of 0.1 to 1.0 equivalent to the
perfluoroalkanesulfonic anhydride:

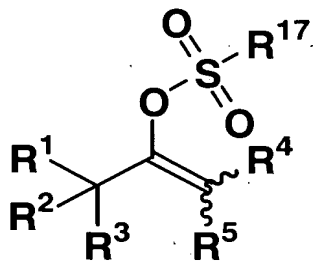


(III)

(wherein R^{18} , R^{19} , R^{20} , R^{21} and R^{22} have the same meanings as defined above, respectively), and wherein
when the content of the pyridine derivative represented by
general formula (III) in the suspension or the solution is
1.0 equivalent to the perfluoroalkanesulfonic anhydride
represented by general formula (II), the
perfluoroalkanesulfonic anhydride represented by general
formula (II), water, an acid, or an acid anhydride is
further added for the reaction.

3. A process for producing a vinyl

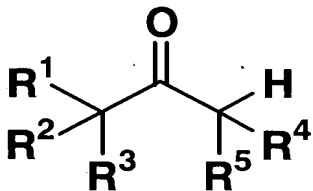
perfluoroalkanesulfonate derivative represented by general formula (IV):



(IV)

(wherein R^1 , R^2 , R^3 , R^4 , R^5 and R^{17} have the same meanings as defined above, respectively)

which comprises reacting a carbonyl compound represented by general formula (I):

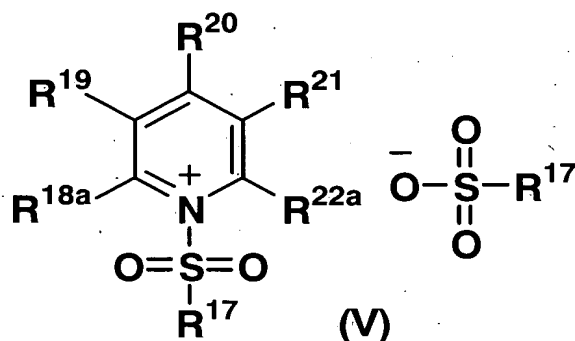


(I)

(wherein R^1 , R^2 , R^3 , R^4 and R^5 have the same meanings as defined above, respectively)

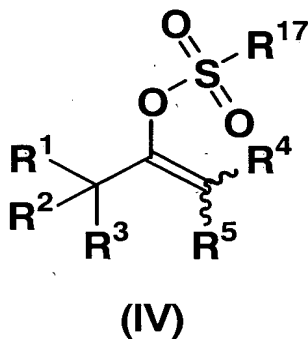
with a 1-(perfluoroalkanesulfonyl)pyridinium

perfluoroalkanesulfonate represented by general formula (V):



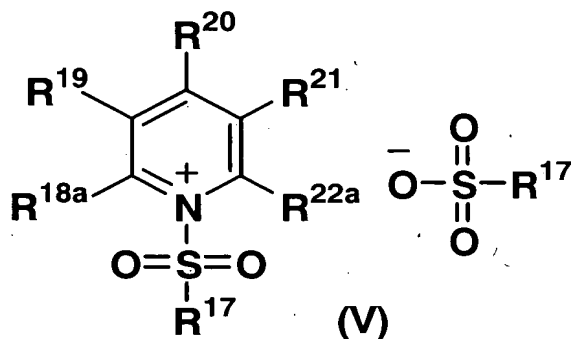
(wherein R^{19} , R^{20} and R^{21} have the same meanings as defined above, respectively, and R^{18a} and R^{22a} may be the same or different and each represents a hydrogen atom, methyl, ethyl, *n*-propyl, isopropyl, methoxy, ethoxy, *n*-propyloxy, or isopropyloxy).

4. A process for producing a vinyl perfluoroalkanesulfonate derivative represented by general formula (IV):



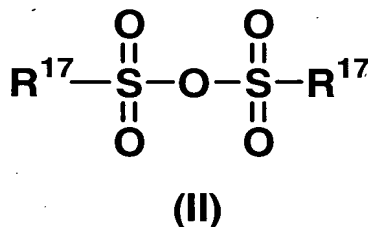
(wherein R^1 , R^2 , R^3 , R^4 , R^5 and R^{17} have the same meanings as defined above, respectively)
which comprises preparing a 1-

(perfluoroalkanesulfonyl)pyridinium perfluoroalkanesulfonate represented by general formula (V):



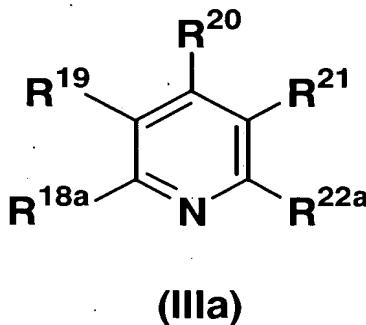
(wherein R^{18a}, R¹⁹, R²⁰, R²¹ and R^{22a} have the same meanings as defined above, respectively)

from a perfluoroalkanesulfonic anhydride represented by general formula (II):

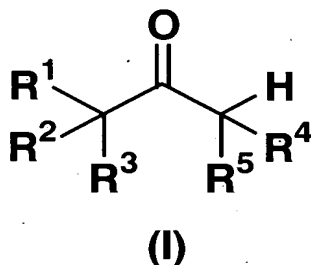


(wherein R¹⁷ has the same meanings as defined above)

and a pyridine derivative represented by general formula (IIIa):



(wherein R^{18a}, R¹⁹, R²⁰, R²¹ and R^{22a} have the same meanings as defined above, respectively);
and then reacting the resulting 1-(perfluoroalkanesulfonyl)pyridinium perfluoroalkanesulfonate with a carbonyl compound represented by general formula (I):



(wherein R¹, R², R³, R⁴, and R⁵ have the same meanings as defined above, respectively).

5. The process according to claim 1 or 2, wherein R¹⁸ and R²² may be the same or different and each represents a hydrogen atom, methyl, ethyl, *n*-propyl, isopropyl, methoxy, ethoxy, *n*-propyloxy, or isopropyloxy.

6. The process according to claim 1 or 2, wherein R¹⁸ and R²² may be the same or different and each represents a hydrogen atom, halogen, or methyl.

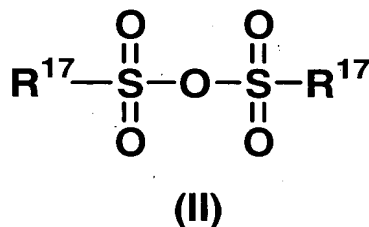
7. The process according to any one of claims 1 to 6, wherein R¹⁹ and R²¹ represent a hydrogen atom.

8. The process according to claim 7, wherein R^{20} represents a hydrogen atom or methyl.

9. The process according to claim 1 or 2, wherein R^{18} , R^{19} , R^{20} , R^{21} , and R^{22} represent a hydrogen atom.

10. The process according to claim 3 or 4, wherein R^{18a} , R^{19} , R^{20} , R^{21} , and R^{22a} represent a hydrogen atom.

11. The process according to any one of claims 1 to 10, wherein the perfluoroalkanesulfonic anhydride represented by general formula (II), water, an acid, or an acid anhydride is further added during the reaction of the perfluoroalkanesulfonic anhydride represented by general formula (II):



(wherein R^{17} has the same meaning as defined above).

12. The process according to any one of claims 1 to 11, wherein R^{17} represents a fluorine atom, trifluoromethyl, or

nonafluoro-*n*-butyl.

13. The process according to any one of claims 1 to 11, wherein R¹⁷ represents a fluorine atom or trifluoromethyl.

14. The process for producing a vinyl perfluoroalkanesulfonate derivative according to any one of claims 1 to 13, wherein at least one selected from the group consisting of methylene chloride, toluene, chlorobenzene, trifluorotoluene, and dichlorobenzene is used as the solvent.

15. The process for producing a vinyl perfluoroalkanesulfonate derivative according to any one of claims 1 to 14, wherein R¹ and R⁴ are combined together with the two carbon atoms which are adjacent to R¹ or R⁴, respectively, and the carbon atom between these two carbon atoms to form a substituted or unsubstituted carbocycle, or a substituted or unsubstituted aliphatic heterocycle; or R¹, R², R³, R⁴ and R⁵ are combined together with the two carbon atoms which are adjacent to R¹, R², R³, R⁴ or R⁵, respectively, and the carbon atom between these two carbon atoms to form a substituted or unsubstituted carbocycle, a substituted or unsubstituted aliphatic heterocycle, or a substituted or unsubstituted condensed ring.

16. The process for producing a vinyl

perfluoroalkanesulfonate derivative according to any one of claims 1 to 14, wherein R^1 , R^2 , R^3 , R^4 and R^5 are combined together with the two carbon atoms which are adjacent to R^1 , R^2 , R^3 , R^4 or R^5 , respectively, and the carbon atom between these two carbon atoms to form a substituted or unsubstituted carbocycle.

17. The process for producing a vinyl perfluoroalkanesulfonate derivative according to any one of claims 1 to 14, wherein R^1 , R^2 , R^3 , R^4 and R^5 are combined together with the two carbon atoms which are adjacent to R^1 , R^2 , R^3 , R^4 or R^5 , respectively, and the carbon atom between these two carbon atoms to form a substituted or unsubstituted condensed ring.